

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
4 November 2004 (04.11.2004)

PCT

(10) International Publication Number
WO 2004/094667 A3

(51) International Patent Classification⁷: **C12Q 1/70**

(21) International Application Number:
PCT/SG2004/000103

(22) International Filing Date: 21 April 2004 (21.04.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/464,115 21 April 2003 (21.04.2003) US
60/464,345 22 April 2003 (22.04.2003) US
60/464,643 23 April 2003 (23.04.2003) US
60/464,965 24 April 2003 (24.04.2003) US
60/496,016 19 August 2003 (19.08.2003) US

(71) Applicant (for all designated States except US):
GENOME INSTITUTE OF SINGAPORE [SG/SG]; 60
Biopolis Street, Genome #02-01, Singapore 138672 (SG).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **REN, Ee Chee**
[MY/SG]; 62 Greenleaf View, Singapore 279301 (SG).
HIBBERD, Martin, L. [GB/SG]; 1 Holland Avenue
#04-05, Willyville, Singapore 278965 (SG). **NG, Lisa**
Fong Poh [SG/SG]; Blk 10B #22-06 Braddell View,
Singapore 579721 (SG).

(74) Agent: **DREW & NAPIER LLC;** 20 Raffles Place,
#17-00 Ocean Towers, Singapore 048620 (SG).

(81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,
AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,
KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,
MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,
PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM,
TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM,
ZW.

(84) Designated States (unless otherwise indicated, for every
kind of regional protection available): ARIPO (BW, GH,
GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),
Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), Euro-
pean (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR,
GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK,
TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW,
ML, MR, NE, SN, TD, TG).

Published:

- with international search report
- before the expiration of the time limit for amending the
claims and to be republished in the event of receipt of
amendments

(88) Date of publication of the international search report:
3 March 2005

For two-letter codes and other abbreviations, refer to the "Guid-
ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.

(54) Title: REAGENTS AND METHODS FOR DETECTING SEVERE ACUTE RESPIRATORY SYNDROME CORONAVIRUS

(57) Abstract: This invention provides reagents and methods for detecting the severe acute respiratory syndrome coronavirus (SARS CoV). This invention also provides related compositions, kits, systems, and computers.

WO 2004/094667 A3

INTERNATIONAL SEARCH REPORT

International Application No

PCT/SG2004/000103

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C12Q1/70

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C12Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, EMBASE, BIOSIS, Sequence Search

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	<p>DROSTEN CHRISTIAN ET AL: "Identification of a novel coronavirus in patients with severe acute respiratory syndrome." THE NEW ENGLAND JOURNAL OF MEDICINE, vol. 348, no. 20, 10 April 2003 (2003-04-10), pages 1967-1976, XP002288120 ISSN: 1533-4406 cited in the application the whole document figure 1B; table 1 published on paper 15-05-2003; published online 10-04-2003.</p> <p>----- -/-</p>	1-32

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

* Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

17 August 2004

Date of mailing of the international search report

23 DEC 2004

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Pinta, V

INTERNATIONAL SEARCH REPORT

 International Application No
 PCT/SG2004/000103

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	<p>KSIAZEK T G ET AL: "A novel coronavirus associated with severe acute respiratory syndrome" NEW ENGLAND JOURNAL OF MEDICINE, vol. 348, no. 20, 10 April 2003 (2003-04-10), pages 1953-1966, XP002276003 ISSN: 1533-4406 cited in the application the whole document page 1956 published on paper 15-05-2003; published online 10-04-2003.</p> <p>-----</p>	1-32
Y	<p>DATABASE EMBL Sequence Version Archive 15 April 2003 (2003-04-15), BCCA GENOME SCIENCES CENTER: "SARS Coronavirus Tor2, complete genome" XP002288433 retrieved from EBI Database accession no. AY274119.1 abstract</p> <p>-----</p>	1-32
A	<p>STEPHENSON C B ET AL: "Phylogenetic analysis of a highly conserved region of the polymerase gene from 11 coronaviruses and development of a consensus polymerase chain reaction assay" VIRUS RESEARCH, AMSTERDAM, NL, vol. 60, no. 2, April 1999 (1999-04), pages 181-189, XP002242737 ISSN: 0168-1702 the whole document</p> <p>-----</p>	
P,A	<p>DE 203 15 159 U (ARTUS GES FUER MOLEKULARBIOLOG) 26 February 2004 (2004-02-26) the whole document</p> <p>-----</p>	1
P,A	<p>MARRA M A ET AL: "The genome sequence of the SARS-associated coronavirus" SCIENCE, AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE,, US, vol. 300, no. 5624, 30 May 2003 (2003-05-30), pages 1399-1404, XP002269483 ISSN: 0036-8075 cited in the application the whole document published online 1 May 2003</p> <p>-----</p> <p style="text-align: center;">-/-</p>	

INTERNATIONAL SEARCH REPORT

International Application No

PCT/SG2004/000103

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,A	ROTA P A ET AL: "Characterization of a novel coronavirus associated with severe acute respiratory syndrome" SCIENCE, AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE,, US, vol. 300, no. 5624, 30 May 2003 (2003-05-30), pages 1394-1399, XP002269482 ISSN: 0036-8075 cited in the application the whole document published online 1 May 2003 -----	
P,A	NG LISA F P ET AL: "Detection of severe acute respiratory syndrome coronavirus in blood of infected patients." JOURNAL OF CLINICAL MICROBIOLOGY. JAN 2004, vol. 42, no. 1, January 2004 (2004-01), pages 347-350, XP002288121 ISSN: 0095-1137 cited in the application the whole document -----	

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SG2004/000103

Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this International application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-32 partially

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-32 (all partially)

Oligonucleotide consisting of SEQ ID NO: n, or comprising a nucleic acid having at least 90% sequence identity to SEQ ID NO: n or a complement thereof, and having a length of 100 or fewer nucleotides, method of detecting a severe acute respiratory syndrome (SARS) coronavirus in a sample comprising contacting nucleic acids from the sample with at least one primer comprising SEQ ID NO: n, method of determining a presence of a SARS coronavirus in a sample comprising contacting nucleic acids and/or amplicons thereof with at least one oligonucleotide that comprise SEQ ID NO: n or a variant having at least 90% sequence identity to SEQ ID NO: n or a complement thereof, composition, kit and system for detecting a SARS coronavirus comprising at least one oligonucleotide comprising SEQ ID NO: n or a variant having at least 90% sequence identity to SEQ ID NO: n or a complement thereof, and system comprising a computer or computer readable medium comprising a data set corresponding to SEQ ID NO: n or a variant having at least 90% sequence identity to SEQ ID NO: n or a complement thereof, wherein SEQ ID NO: n is SEQ ID NO: 1.

2. claims: 1-32 (all partially)

as for invention 1, wherein SEQ ID NO: n is SEQ ID NO: 2.

3. claims: claims 1-32 (all partially)

as for invention 1, wherein SEQ ID NO: n is SEQ ID NO: 3.

4. claims: claims 1-32 (all partially)

as for invention 1, wherein SEQ ID NO: n is SEQ ID NO: 4.

5. claims: claims 1-32 (all partially)

as for invention 1, wherein SEQ ID NO: n is SEQ ID NO: 5.

6. claims: claims 1-32 (all partially)

as for invention 1, wherein SEQ ID NO: n is SEQ ID NO: 6.

7. claims: claims 1-32 (all partially)

as for invention 1, wherein SEQ ID NO: n is SEQ ID NO: 7.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

8. claims: claims 1-32 (all partially)

as for invention 1, wherein SEQ ID NO: n is SEQ ID NO: 8.

9. claims: claims 1-32 (all partially)

as for invention 1, wherein SEQ ID NO: n is SEQ ID NO: 9.

10. claims: claims 1-32 (all partially)

as for invention 1, wherein SEQ ID NO: n is SEQ ID NO: 10.

11. claims: claims 1-32 (all partially)

as for invention 1, wherein SEQ ID NO: n is SEQ ID NO: 11 or
SEQ ID NO: 23.

12. claims: claims 1-32 (all partially)

as for invention 1, wherein SEQ ID NO: n is SEQ ID NO: 12.

13. claims: claims 1-32 (all partially)

as for invention 1, wherein SEQ ID NO: n is SEQ ID NO: 15.

14. claims: claims 1-32 (all partially)

as for invention 1, wherein SEQ ID NO: n is SEQ ID NO: 16.

15. claims: claims 1-32 (all partially)

as for invention 1, wherein SEQ ID NO: n is SEQ ID NO: 17.

16. claims: claims 1-32 (all partially)

as for invention 1, wherein SEQ ID NO: n is SEQ ID NO: 18.

17. claims: claims 1-32 (all partially)

as for invention 1, wherein SEQ ID NO: n is SEQ ID NO: 19.

18. claims: claims 1-32 (all partially)

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

as for invention 1, wherein SEQ ID NO: n is SEQ ID NO: 20.

19. claims: claims 1-32 (all partially)

as for invention 1, wherein SEQ ID NO: n is SEQ ID NO: 21.

20. claims: claims 1-32 (all partially)

as for invention 1, wherein SEQ ID NO: n is SEQ ID NO: 22.

21. claims: claims 1-32 (all partially)

as for invention 1, wherein SEQ ID NO: n is SEQ ID NO: 24.

Information on patient family members

PCT/SG2004/000103

Form PCT/ISA/210 (patent family annex) (January 2004)